

CLAIMS

- 5 1. A reactive shaped charge liner comprising a stoichiometric composition of two metals whereby the liner is capable, in operation, of an exothermic reaction upon activation of an associated shaped charge, and in which the two metals are provided in respective proportions calculated to give an electron concentration of 1.5.
- 10 2. A liner according to any preceding claim in which one of the metals is aluminium.
3. A liner according to any preceding claim in which one of the metals is selected from nickel and palladium.
- 15 4. A liner as claimed in any one of the preceding claims wherein the composition is a pressed particulate composition.
5. A liner according to any preceding claim, wherein a binder is added to aid consolidation.
- 20 6. A liner according to any preceding claim, wherein at least one of the metals is coated with a binder to aid consolidation
- 25 7. A liner according to any one of claims 5-6, wherein the binder is selected from a polymer.
8. A liner according claim 7 wherein the polymer is selected from a stearate, wax or epoxy resin.
- 30 9. A liner according to claim 7, wherein the polymer is an energetic polymer.

10. A liner according to claim 9, wherein the energetic binder is selected from Polyglyn (Glycidyl nitrate polymer), GAP (Glycidyl azide polymer) or Polynimmo (3-nitratomethyl-3-methyloxetane polymer).
- 5 11. A liner according to any one of claims 5-6, wherein the binder is selected from lithium stearate or zinc stearate.
12. A liner according to any one of claims 5 to 11, wherein the binder is present in the range of from 0.1 to 5% by mass.
- 10 13. A liner according to any preceding claim, wherein the composition is particulate, the particles having a diameter 10 μ m or less.
14. A liner according to claim 13, wherein the particles are 1 μ m or less in
15 diameter.
15. A liner according to claim 14, wherein the particles are 0.1 μ m or less in diameter.
- 20 16. A liner according to any preceding claim, wherein the thickness of liner is selected in the range of from 1 to 10% of the liner diameter.
17. A liner according to claim 16 wherein the thickness of liner is selected in the range of from 1 to 5% of the liner diameter.
- 25 18. A liner according to any preceding claim, wherein the thickness of the liner is non-uniform across the surface area of the liner.
19. A liner according to any preceding claim, wherein the composition further
30 comprises at least one further metal, wherein the at least one further metal is not capable of an exothermic reaction upon activation of the shaped charge liner.

20. A liner according to claim 19, wherein the at least one further metal is selected from copper, tungsten, or an alloy thereof.
- 5 21. A shaped charge perforator comprising a liner according to any preceding claim.
- 10 22. A perforator according to claim 21 comprising a housing, a quantity of high explosive located within the housing and a liner according to any preceding claim located within the housing so that the high explosive is positioned between the liner and the housing.
- 15 23. A perforation gun comprising one or more shaped charge perforators according to any one of claims 21-22.
24. A method of completing an oil or gas well using one or more shaped charge liner according to any one of claims 1-20.
- 20 25. A method of completing an oil or gas well using a one or more shaped charge perforators, according to any one of claims 21-22.
- 25 26. A method of completing an oil or gas well using one or more perforation guns according to claim 22.
27. A method of improving fluid outflow from a well comprising the step of perforating the well using perforator according to any one of claims 21-22.